

# MALAYAN FILARIASIS IN THE TRANSMIGRATION SETTLEMENTS OF PARIGI, CENTRAL SULAWESI, INDONESIA

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## ABSTRACT

Salah satu program dari Rencana Pembangunan Nasional Lima tahun adalah peningkatan dan perluasan usaha pertanian, terutama didaerah subur dan berpenduduk tipis di Sumatera, Kalimantan dan Sulawesi yang disertai dengan pelaksanaan usaha transmigrasi kedaerah ini dari daerah berpenduduk padat Jawa, Madura, Bali dan Lombok.

Untuk mengetahui keadaan filariasis di daerah tersebut pertama ini, maka dalam bulan April 1972 telah diperiksa 240 transmigran dari Bali dan 282 penduduk Sulawesi yang hidup berdampingan dalam dua kampung yang terpencil yaitu Tanalanto dan Masi didistrik Parigi, Sulawesi Tengah.

Parigi dikenal endemis terhadap filariasis sedangkan di Bali dimana transmigran berasal, tidak dilaporkan adanya penyakit ini.

Dari hasil penelitian tersebut dapat dikemukakan :

- (1) daerah transmigrasi Parigi, Sulawesi Tengah adalah endemis terhadap filariasis yang disebabkan oleh *Brugia malayi*, periodik nokturna.
- (2) timbulnya filariasis diantara transmigran berhubungan erat dengan lamanya mereka berada didaerah endemis ini.
- (3) baik pada transmigran maupun pada penduduk asli, tidak nyata adanya perbedaan frekwensi penyakit menurut jenis kelamin.
- (4) Frekwensi penyakit ini pada transmigran terlihat menonjol pada golongan umur 10 - 49 tahun, sedangkan pada penduduk asli pada semua golongan umur.
- (5) walaupun keadaan intensitas infeksi dari penyakit ini pada kedua golongan penduduk di Tanalanto, hampir sama, namun pada transmigran terdapat dengan micro-

*filariemia* dan dengan gejala klinis filariasis yang lebih ringan dibanding dengan penduduk asli.

## INTRODUCTION

The National Five Year Development Plan initiated an intensive and extensive agricultural development program in under-populated yet fertile areas of Sumatera, Kalimantan and Sulawesi, establishing rural communities with roads, markets, schools etc. and promoting transmigration from over-populated areas of Java, Madura, Bali and Lombok. Central Sulawesi was selected as a transmigration settlement area for Javanese and Balinese, however this area as well as other part of Sulawesi and part of Sumatra or Kalimantan were endemic for filariasis (Lie, 1970).

Health care of the population in the transmigration settlements is very important, especially control of highly prevalent parasitic diseases such as malaria and filariasis which would severely decrease the working capacity of farmers is essential for the success and prosperity of these areas.

The district of Parigi is sparsely populated with many hectares of fertile yet uncultivated lands. The principal agricultural crop is rice, coconuts are also grown for export. Christianity is the predominant religion of indigenous inhabitants as well as of transmigrants.

The district is situated on the east coast of Central Sulawesi, between 0°40' - 1°00' S latitude and 120°00' - 120°20' E longitude (Fig. -1)

The sub-villages selected for study were block- II and block- III of Tanalanto with a population of 554 and Masi of Nambaru with

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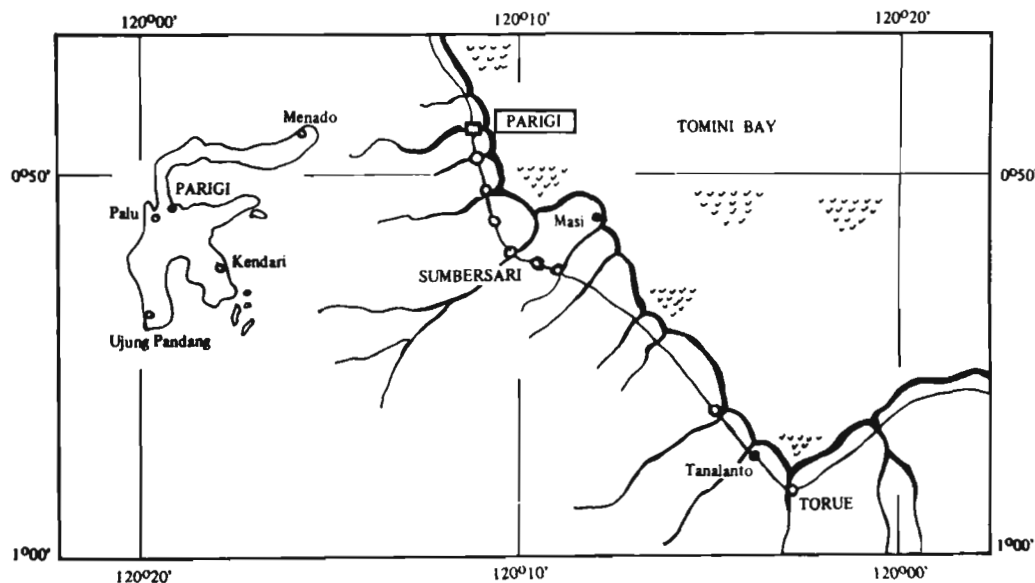
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a population of 204, in the southern part of the district of Parigi. Tanalanto was initially settled in 1960 by Sulawesians from Poso, Central Sulawesi, Balinese transmigrants arrived in 1962. Masi was first settled by Sulawesians from Minahasa, North Sulawesi, in 1964, then abandoned from 1965 to 1967. In 1968 transmigrants from Bali resettled Masi and shortly thereafter the original settlers returned. Filariasis has been reported endemic in Poso and Minahasa, and no case has been reported from Bali (Ministry of Health, 1972, unpublished

report). In both villages the Sulawesians and Balinese live side by side.

This study was designed to determine the current prevalence of filariasis in the transmigration settlement areas of Parigi, Central Sulawesi, where transmigrants from Bali have settled during the past 10 years and to determine if there were significant differences in the infection rates of indigenous Sulawesians and the Balinese transmigrants. The study was carried out in April 1972.

Figure-1. MAP OF THE TRANSMIGRATION SETTLEMENTS OF PARIGI, CENTRAL - SULAWESI, INDONESIA.



## MATERIALS AND METHODS

Blood films were obtained from persons who came to a designated center one hour after sunset. A measured 20 cu.mm. of blood was drawn with a capillary tube by finger prick, and thick films made.

Name, age and sex of each person and also ethnic sub-group and length of stay in the area were recorded.

Blood films were dried overnight and the films haemolysed and stained the next morning in buffered Giemsa solution for 30 minutes at 10 cc. Giemsa stock solution in 190 cc. buffered water PH 7.2

The total microfilariae and the species of the parasite were recorded.

A periodicity study was carried out using 10 volunteers from Tanalanto, A blood film of 20 cu.mm. from each volunteer was made at two hourly intervals and the number of microfilariae counted for each reading. The total microfilariae of these volunteers at two hourly intervals were in turn expressed as percentages of the peak count and mean was calculated for the 10 volunteers

A clinical survey was made by recording the symptoms of filariasis: elephantiasis, hydrocele, retrograde lymphangitis, lymphadenitis, abscess and scars. Enlarged lymphnodes with the history of recurrent attacks of inflammation in the past 3 months were recorded as adenolymphangitis.

## RESULTS

A total of 522 blood films, 240 of transmigrants and 282 of indigenous population

were obtained from the 758 inhabitants of the villages of Tanalanto and Masi of Namburu, in the district of Parigi. Results are presented in Table - I.

Table- I RESULT OF MICROFILARIAL AND CLINICAL SURVEYS IN TANALANTO AND MASI, DISTRICT OF PARIGI, CENTRAL SULAWESI; APRIL 1972.

Sub-villages surveyed:	Number examined	Microfilaria Survey				Clinical Survey					
		Mf - positive		Total Mf-count	Average Mf-count in 20 cu.mm. blood per:		Adenolymph-angitis, abscess and scars		Elephantiasis		
		Number	Percent		pos. films	total films	Number	Per-cent	Num-ber	Per-cent	
1. block II & III of TANALANTO:											
1.1. Sulawesi	202	84	42	5.542	65.9	27.4	60	30	9	4	
1.2. Balinese	138	18	13	1.145	63.6	8.5	16	12	0	0	
1.3. Total	336	102	30	6.687	65.5	19.9	76	22	9	3	
2. Masi of NAMBARU :											
2.1. Sulawesi	80	9	11	755	83.9	4.4	59	74	4	5	
2.2. Balinese	106	0	0	0	0	0	45	43	0	0	
2.3. Total	186	9	5	755	83.9	4.1	104	57	4	2	
3. Villagers :											
3.1. Sulawesi	282	93	33	6.296	67.7	22.3	119	42	13	5	
3.2. Balinese	240	18	8	1.145	63.6	4.7	61	25	0	0	
3.3. Total	522	11	21	7.443	67.0	14.2	180	34	13	2	

The overall microfilarial rate for both villages was 21 percent. The highest microfilarial rate was found in the village of Tanalanto, where 30 percent of the people examined were infected whereas in Masi the microfilarial rate was only 5 percent.

Only *Brugia malayi* was found and most microfilariae were exsheathed.

The microfilarial rate in indigenous Sulawesians was 33 percent and in the Balinese transmigrants was 8 percent. In Tanalanto alone, the microfilarial rate among the indigenous Sulawesians was 42 percent and in the Balinese transmigrants was 13 percent. In Masi, the microfilarial rate of indigenous Sulawesi was 11 percent and no cases were found in the Balinese transmigrants.

The average microfilarial count in 20 cu.mm. of blood per positive films was 65.5 in Tanalanto and 83.9 in Masi. In general, there was 67.7 for indigenous Sulawesians and 63.6 for Balinese transmigrants.

In Tanalanto alone the average among the indigenous Sulawesians was 65.9 and among the

Balinese transmigrants was 63.6 and the average among the male indigenous Sulawesians was 80.5 whereas in female indigenous Sulawesians was 45.5 but no difference between male and female of Balinese transmigrants was found: 64.4 and 63.0 respectively.

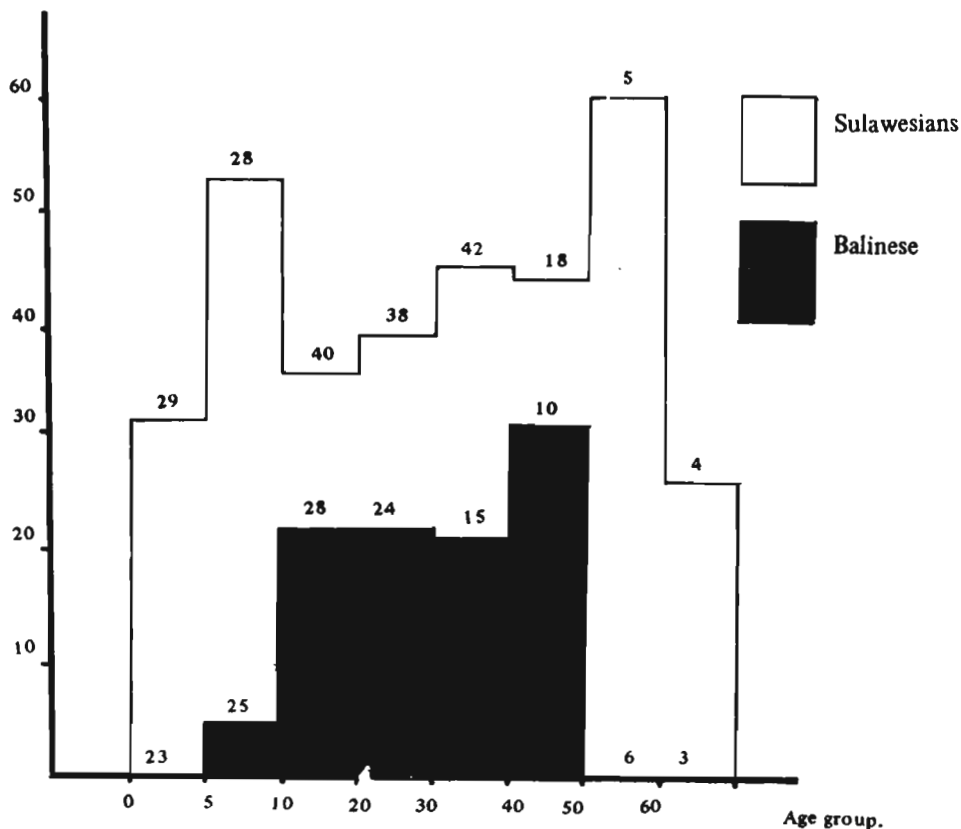
Fifty seven percent of all the microfilaraemia cases had 25 or less microfilariae in 20 cu.mm. of blood and 20 percent of cases had more than 100 microfilariae. The highest microfilarial count of 572 was found in 15 years old girl in Tanalanto.

Age and ethnic sub-group distribution of microfilaraemia cases from Tanalanto are presented in Figure-2,

Figure- 2.

AGE AND ETHNIC SUB-GROUP DISTRIBUTION OF MICROFILARAEMIA CASES IN TANALANTO, DISTRICT OF PARIGI, CENTRAL - SULAWESI, APRIL 1972.

Percentage of cases



and age-sex distribution of microfilariasis cases in both indigenous Sulawesians and Balinese

transmigrants in Tanalanto are presented in Table-II.

Table. II.

AGE-SEX DISTRIBUTION OF MICROFILARAEMIA CASES IN TANALANTO, DISTRICT OF PARIGI, APRIL 1972.

Age-group	Villagers:					
	Male		Female		Total	
	No. exd.	Per-cent pos.	No. exd.	Per-cent pos.	No. exd.	Per-cent pos.
0 - 4	23	13	29	21	52	17
5 - 9	25	32	26	31	51	31
10 - 19	34	21	34	39	68	24
20 - 29	30	47	32	19	62	32
30 - 39	32	44	25	32	57	39
40 - 49	16	44	12	33	28	39
50 - 59	8	38	3	0	11	27
60 - more	4	0	3	33	7	14
TOTAL	172	33	164	28	336	30

Nine indigenous Sulawesian children, six girls and three boys in the 0–5 years age-group were found infected. The youngest person infected with *Brugia malayi* was an indigenous Sulawesian girl of one year from Tanalanto and the youngest Balinese transmigrant was a seven years old girl.

The frequency of microfilaraemia was highest in the 30–49 years age-group and indigenous Sulawesians had considerably higher frequencies of microfilaraemia in every age-group.

The overall microfilarial rate in males was slightly higher than in females, 33 percent 28 percent respectively. In Tanalanto, the microfilarial rate in male indigenous Sulawesian was 42 percent and female was 40 percent; in male Balinese transmigrants was 12 percent and female was 15 percent.

The periodicity study using 10 volunteers from Tanalanto for 24 hour period, demonstrated the presence of a nocturnally periodic type of *Brugia malayi* (Fig-3).

Microfilariae count as percentage of peak count

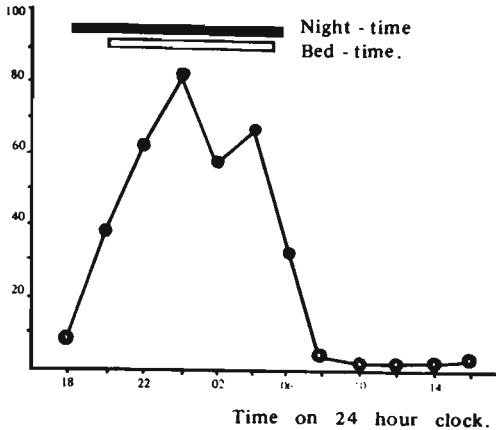


Figure 3.  
SHOWING THE PERIODICITY OF THE MICROFILARIAE OF BRUGIA MALAYI IN TANALANTO, DISTRICT OF PARIGI, CENTRAL – SULAWESI, APRIL 1972.

Very few microfilariae were found in blood films made during the hours of daylight and had

two peaks occurred between midnight and six a.m. (Tabl.- III).

Table- III MICROFILARIAE PERIODICITY COUNTS CARRIED OUT ON THE TEN VOLUNTEERS IN TANALANTO, DISTRICT OF PARIGI, CENTRAL – SULAWESI, APRIL 1972.

Carrier Number	Age yrs	Sex M/F	Total number of microfilariae in 20 cu.mm. of peripheral blood sample taken on 24 hour clock cycle											
			18	20	22	24	02	04	06	08	10	12	14	16
1.	16	F	0	167	116	289	182	271	96	3	0	0	0	0
2.	18	F	0	19	47	61	29	48	0	3	0	0	0	0
3.	31	F	2	17	41	33	80	109	71	3	0	0	0	1
4.	46	F	4	61	29	209	21	46	26	1	0	0	0	0
5.	46	F	89	249	324	356	275	136	22	0	0	0	0	20
6.	16	M	0	8	14	15	12	17	4	0	0	0	0	0
7.	26	M	0	18	263	248	231	416	118	58	3	0	0	0
8.	27	M	50	34	43	91	56	31	21	8	0	0	1	1
9.	35	M	1	97	129	142	178	157	38	0	0	0	0	5
10.	50	M	3	44	64	64	27	22	124	5	5	2	3	1

Physical examination carried out on 522 villagers demonstrated 13 cases of elephantiasis. Twelve cases with elephantiasis of leg below the knee and one case both below the knee and on the lower fore arm.

Three of these 13 cases had microfilariae in their blood.

Eight of the 9 elephantiasis cases from Tanalanto were 25 years of age or more, whereas three of the 4 cases from Masi were less than 25 years old. The youngest person with elephantiasis was an indigenous Sulawesi boy of 15 years from Masi. No elephantiasis case was seen among the Balinese transmigrants.

Adenolymphangitis, abscess and scars were recorded for 42 percent of the indigenous Sulawesians and 25 percent of Balinese transmigrants.

Fever and adenolymphangitis were recorded from a 13 year old Balinese boy only four months after arriving at Masi.

Genital lesions were neither seen in indigenous Sulawesians or Balinese transmigrants.

## DISCUSSION

Two hundred and forty Balinese transmigrants and 282 indigenous Sulawesians of the villages of Tanalanto and Masi of Nambaru in the district of Parigi were examined for filariasis in April 1972.

Although filariasis has been known endemic in the district of Parigi, (Tesch, 1937), this study confirm the new endemic foci of filariasis due to nocturnally periodic type of *Brugia malayi* in the transmigration settlements of Parigi, Central Sulawesi.

The microfilarial rate of the Balinese transmigrants in Tanalanto that settled during the past 10 years was 13 percent as compared with no case of filariasis was found among the Balinese transmigrants in Masi, after 4 years. From 25 children of 5-9 years age-group of Balinese transmigrants born at Tanalanto examined, 4 percent were found infected as compared with no case was found among the 23 children of the age-group of 0-4 years of Balinese transmigrants born at Tanalanto examined (Fig.- 2). Duration in the endemic areas or the length of the period of exposure to infection is a factor influencing the microfilarial rate among the Balinese transmigrants in Parigi. Similar results were reported in studies of

Jawanese transmigrants in Kalawara, Central Sulawesi (Tesch, 1937) and studies of Jawanese transmigrants in Wonosobo, South Sumatera (Lie, 1960).

In Tanalanto, the microfilarial rate in males, 33 percent, was slightly higher than females, 28 percent (Table.- II). However, in the Balinese population more female, 15 percent, than males, 12 percent were infected, whereas in the Sulawesi population the reverse was true, 42 percent of the males as compared with 40 percent of the females.

This result does not agree with Tesch's observations in Kalawara area of Central Sulawesi in 1937. There does, however, appear to be a significant difference in males and females with regards to the average microfilarial count in 20 cu.mm. of blood per positive films or we say to the intensity of infection among the Sulawesi population where for males was 80.5 and for females 45.5.

The frequency of microfilaraemia cases was highest in the 30-49 years age-group. Sulawesi population had considerably higher frequencies in every age-group, whereas Balinese population had only in the age-group of 10-49 years.

In Tanalanto, the average microfilarial count in 20 cu.mm. of blood per positive films or we say the intensity of infection of filariasis among the Balinese transmigrants was 63.6 whereas among the indigenous Sulawesians was 65.9. Although the degree of intensity of infection of these two groups of villagers was equal, striking differences were found in the microfilarial rate and in the clinical symptoms of the disease. The microfilarial rate of the Balinese transmigrants was 13 percent, as compared with 42 percent of the indigenous Sulawesians. Twelve percent of the transmigrants were found with the clinical symptoms of adenolymphangitis, abscess and scars as compared with 30 percent of the indigenous population. No case of elephantiasis was found among the transmigrants whereas 4 percent of the indigenous Sulawesian were found with this symptom.

The low microfilarial rates with also the few clinical symptoms of filariasis in the Balinese transmigrants in comparison with those of the indigenous population in transmigration settlements of Parigi, Central Sulawesi, do not agree with Tesch's observations in transmigration

settlements of Kalawara, Central Sulawesi in 1937 and with Lie's observations in transmigration settlements of Wonosobo, South Sumatra in 1960. It is not likely that these differences are due to differences in genetic make up. Most probably there are differences in the risk of exposures between the two groups.

## SUMMARY

This study confirms the new foci of filariasis due to nocturnally periodic type of *Brugia malayi* in the transmigration settlements of Parigi, Central Sulawesi.

The microfilarial rates of the transmigrants grow in correlation with the length of the period of exposure to infection in the endemic areas.

There was no significant difference of microfilarial rates in males and females of both transmigrants and indigenous population in Tanalanto.

The frequency of microfilaraemia cases among the transmigrants was highest in the 10-49 years age-group, whereas in the indigenous population had considerably higher in every age-group.

Although the average microfilarial count in 20 cu.mm. of blood per positive films or we say the intensity of infection of filariasis among the transmigrants and the indigenous population in Tanalanto, was equal, there were found low microfilarial rates and few clinical symptoms of filariasis in the transmigrants as compared with the indigenous population.

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